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MAGNESIUM [ADVANCE RELEASE]

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MAGNESIUM

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During 2014, total magnesium imports increased by 13% and consumption decreased by 4%. Net imports of magnesium increased by 18%. Imports continued to provide a significant share of U.S. supply of primary magnesium as there has been only one domestic producer since 2001. Since 1998, the U.S. share of the world's primary magnesium capacity has decreased to 3% from 30%. Excluding production in the United States, worldwide primary magnesium production increased by 11% in 2014 to 973,000 metric tons (t) from 873,000 t in 2013 (table 8). China, with 85% of global capacity and 90% of global production (excluding the United States), accounted for most of the increase.

During 2014, domestic prices for magnesium were generally stable, whereas prices in China and Europe continued to decrease following a World Trade Organization ruling that required the repeal of a 10% tax on magnesium exports by the Government of China at the beginning of 2013. Since the United States imposed antidumping duties on magnesium from China in 2001, only minor amounts of primary magnesium ingot have been imported from China; however, China accounted for about one-third of the magnesium alloy imports to the United States. The Platts Metals Week annual average magnesium price of $2.15 per pound in 2014 was slightly lower than the 2013 annual average price of $2.18 per pound.

U.S. consumption of primary magnesium decreased by 4% to 65,700 t in 2014 from 68,500 t in 2013. Decreased magnesium consumption for aluminum alloys and castings was partially offset by increased consumption for reducing titanium and other metals. Production of secondary magnesium decreased slightly in 2014 compared with that in 2013 (table 1). Consumer inventories of primary magnesium and alloys were 124% more at yearend 2014 than at yearend 2013. Consumer inventories of secondary magnesium and alloys were 200% more at yearend 2014 than at yearend 2013.

Magnesium is the eighth most abundant element in the Earth's crust and the third most plentiful dissolved element in seawater. Magnesium metal is recovered from the mineral dolomite, lake brines, and seawater. Magnesium's light weight and ease of casting make it desirable for transportation products. Magnesium readily alloys with aluminum to make aluminum products stronger and easier to machine. Magnesium's strong affinity for halides such as chlorine and fluorine make it useful for reducing metal halides such as those of beryllium, hafnium, titanium, uranium, and zirconium to pure metal. Magnesium's chemical properties also make it useful to remove sulfur from iron and steel.

Legislation and Government Programs

The U.S. Department of Commerce, International Trade Administration, conducted an administrative review of the antidumping order on magnesium imported from China by Tianjin Magnesium International Co. Ltd. (TMI) between April 1, 2012, and May 31, 2013. The review determined that TMI did not export magnesium to the United States during the review period and the antidumping duty of 339.6% ad valorem would remain on imports of pure magnesium from TMI (U.S. Department of Commerce, International Trade Administration, 2014).

Production

Because there was only one primary magnesium producer operating in the United States, production data were withheld by the U.S. Geological Survey (USGS) to avoid disclosing company proprietary data. U.S. Magnesium LLC (Salt Lake City, UT) was the sole producer of primary magnesium in the United States. The company recovered magnesium electrolytically from brines from the Great Salt Lake at its 63,500-metric-ton-per-year (t/yr) plant in Rowley, UT. U.S. Magnesium announced plans to expand the magnesium plant's capacity to 76,500 t/yr by yearend 2015 (Cowden, 2014b). Employees of U.S. Magnesium represented by the United Steelworkers union ratified a 5-year contract in August (McBeth, 2014d). Secondary metal recovery from magnesium and aluminum scrap was essentially unchanged from that in 2013. About 86% of the secondary magnesium recovered was contained in aluminum alloys and 13% was contained in magnesium alloy castings (table 2).

Nevada Clean Magnesium Inc. (Canada) received design plans for a pilot furnace to test recovery of magnesium from dolomite at its Tami-Mosi magnesium project near Ely, NV, and amended its preliminary economic assessment for the project. The proposed project would produce 30,000 t/yr of magnesium from a dolomite deposit with an average grade of 12.3% magnesium (Nevada Clean Magnesium Inc., 2014a, b).

In August, Spartan Light Metal Products Inc. (St. Louis, MO) started construction of an expansion to its aluminum and magnesium diecasting plant in Mexico, MO. Spartan produces die-cast parts for the automobile industry. The expansion was expected to be completed in September 2015 (Susan, 2014).

Environment

The cover gas sulfur hexafluoride (SF_6), which is used to protect molten magnesium from oxidation, has been identified as a potential factor in global warming. Although studies on the effects of the gas continued, its long atmospheric life (about 3,000 years) and high potential as a greenhouse gas [23,900 times the global warming potential of carbon dioxide (CO_2)] resulted in a call for voluntary reductions in emissions. In 1999, the U.S. magnesium industry, the International Magnesium Association, and the U.S. Environmental Protection Agency

(EPA) began a voluntary SF_6 emissions reduction partnership. The major molten magnesium processes that require SF_6 melt protection are primary production; secondary production; die, permanent mold, and sand casting; wrought products production; and anode production. According to the EPA, the magnesium industry emitted 1.4 teragrams CO_2 equivalent of SF_6 in 2013, representing a decrease of approximately 13% from 2012 emissions. The decrease was attributed to continuing industry efforts to use SF_6 alternatives, such as Novec™ 612 (dodecafluoro-2-methyl-3-pentanone) and sulfur dioxide, as part of the industry and EPA's partnership. These alternatives have lower global warming potential than SF_6 and tend to decompose quickly during their exposure to the molten metal (U.S. Environmental Protection Agency, 2015b, p. 4–76 to 4–79).

In January 2011, the U.S. Circuit Court of Appeals for the District of Columbia denied U.S. Magnesium's appeal of EPA's decision to include the company's Rowley, UT, magnesium production facility as a Superfund site. U.S. Magnesium had challenged the EPA's 2008 listing decision and argued that the EPA had overestimated the risk of pollutants from the facility entering the air and soil. Designation of the facility as a Superfund site gave EPA the authority to investigate the site further to determine if a cleanup was necessary. The designated site encompasses 1,830 hectares (4,530 acres) on the southwest edge of the Great Salt Lake. An EPA study of the site continued in 2014 but cleanup activities had not started (Fahys, 2011; U.S. Environmental Protection Agency, 2015a).

Consumption

Data for magnesium metal consumption were collected from two voluntary surveys of U.S. operations by the USGS. Of the 55 companies canvassed for magnesium consumption data, 44% responded, representing 53% of the magnesium-base scrap consumption listed in table 2 and the primary magnesium consumption listed in table 3. Data for the 31 nonrespondents were estimated on the basis of prior-year consumption levels and other factors.

Primary magnesium consumption in 2014 was about 4% less than that in 2013, which was attributed to a 12% decrease in consumption for die castings and an 8% decrease in consumption for aluminum alloys. The decrease of primary magnesium consumption in aluminum alloys was attributable to one primary aluminum smelter in New York permanently shutting down 84,000 t/yr of capacity in January and a 10-week shutdown of 54,000 t/yr of capacity at a smelter in Indiana (Alcoa Inc., 2014; Matyi, 2014). The principal applications for magnesium in the United States in 2014 were alloying aluminum (34%); reduction of titanium tetrachloride, zirconium chloride, beryllium fluoride, uranium tetrafluoride, and hafnium chloride to produce metals (30%); diecasting (13%); and desulfurization of iron and steel (12%). Consumption of primary magnesium for production of titanium and other metals increased by 3% from that in 2013 (table 3). Consumption of secondary magnesium scrap for castings in 2014 decreased by 12% to 10,500 t from 11,900 t in 2013 (table 2). Secondary magnesium recovery was essentially unchanged compared with that in 2013 as increased magnesium recovery from aluminum base scrap offset decreased recovery from magnesium base scrap (table 2).

The Boeing Co. (Chicago, IL) reported that its deliveries of the 787 Dreamliner, an aircraft that contains a significant quantity of titanium, increased by 75% compared with deliveries in 2013. Boeing reported a significant backlog of orders for the 787 Dreamliner, indicating that consumption of magnesium for titanium reduction may remain stable or increase for several years (Boeing Co., The, 2015, p. 13).

In March, Magnesium Elektron Ltd. (Manchester, United Kingdom) announced that Zim Flugsitz GmbH (Germany) was manufacturing aircraft seat frames using its proprietary magnesium alloy containing rare-earth elements (REEs). Initial use would be limited to low-volume, non-commercial aircraft, but installation on commercial passenger aircraft was expected later. Introduction of magnesium alloy seat frames to passenger aircraft was made possible after the Federal Aviation Administration announced in June 2013 that magnesium alloys could be used on the condition that the alloys meet flammability standards. The use of REEs decreases the flammability of magnesium as oxidation of the REEs forms a crust on the surface of burning magnesium, preventing further combustion (Magnesium Elektron Ltd., 2014).

Ford Motor Co. started production of the redesigned 2015 model F–150 Series truck, and deliveries to showrooms started in December 2014. Instead of steel, the new design used aluminum sheet containing magnesium for the body panels, and it weighed approximately 700 pounds less than prior models. The trucks were built at the Dearborn, MI, and Kansas City, MO, assembly lines that had a combined capacity of 700,000 trucks per year (Ford Motor Co., 2014).

Research and Development

The U.S. Department of Energy's Advanced Research Projects Agency-Energy continued to research a method of recovering magnesium from seawater using less energy than current production methods at its Pacific Northwest National Laboratory (PNNL) in Richland, WA. Global Seawater Extraction Technologies, LLC and U.S. Magnesium partnered with PNNL in the 3-year project, which was announced in 2013 and was expected to cost $2.7 million. The new process was projected to produce magnesium at a cost of less than $1.50 per kilogram and would consume approximately 25 kilowatthours of power per kilogram of magnesium produced (White, 2013, 2014).

Stocks

Primary magnesium producers' yearend 2014 stock data were withheld to avoid disclosing company proprietary data. Consumer stocks of primary and alloy magnesium were 9,000 t at yearend 2014, 124% more than the yearend 2013 stocks of 4,020 t. Consumer stocks of secondary magnesium were 5,000 t at yearend 2014, 200% more than the 1,670 t at yearend 2013.

Prices

At the beginning of 2014, the Platts Metals Week U.S. spot Western magnesium price range was $2.10 to $2.15 per pound, but it increased to $2.10 to $2.20 per pound by the end of January, where it remained until yearend. The annual average Platts Metals Week U.S. spot Western magnesium price in 2014 was $2.15 per pound, slightly less than the 2013 average of $2.17 per pound. According to traders and producers, however, spot prices were not representative of the prices paid for most magnesium consumed, as nearly all primary magnesium was purchased through annual contracts (Cowden, 2013; McBeth, 2013, 2014b). Prices contracted for delivery in 2014 ranged from about $1.80 per pound to more than $2.00 per pound. Prices contracted in the fall of 2014 for delivery in 2015 ranged from about $1.80 per pound to $1.92 per pound, with most contracts reported to be in the range of $1.82 per pound to $1.88 per pound (McBeth, 2014c).

The monthly average magnesium price in China started the year at $2,595 per metric ton, but dropped to $2,485 per metric ton in March. The price generally declined gradually to $2,435 per metric ton in October, and then declined by 5% in November to $2,335 per metric ton, where it stayed until yearend. The annual average magnesium price in China was $2,472 per metric ton, 8% lower than in 2013. The monthly average magnesium price in Europe was $2,775 per metric ton in January and generally followed the same downward trend as the price in China, ending the year at $2,425 per metric ton. The annual average magnesium price in Europe was $2,601 per metric ton, 7% lower than in 2013. Abundant supplies of magnesium relative to consumption in China and stagnant demand in Europe were cited for the price declines (Yee, 2014a, b).

Foreign Trade

Total U.S. magnesium exports in 2014 were 6% more than those in 2013 (table 5). Mexico (37%), Canada (21%), and Brazil and Singapore (15% each) were the principal destinations. However, exports of semifabricated products in 2014 were 28% lower than those in 2013. Magnesium imports for consumption in 2014 were 13% more than those in 2013 (table 6). Israel was the leading source of imported magnesium metal (72%) and the second-leading source of alloys (24%). China was the leading supplier of magnesium alloys (32%). Because of the continued imposition of antidumping duties, pure magnesium imports from China have been minimal for several years and no magnesium metal was imported from China in 2014. Canada accounted for 40% of the scrap imports, which accounted for 37% of total magnesium imports (table 6). Total net imports of magnesium were 18% more than those in 2013; net imports of alloys, metal, and scrap increased by 62%, 9%, and 6%, respectively, and the United States went from being a net exporter of semifabricated products to being a net importer (tables 5, 6).

World Review

Global production of primary magnesium (excluding the United States) was 973,000 t, 11% more than was produced in 2013 (table 8). Global primary capacity increased by 3% to 1.89 million metric tons per year (Mt/yr).

Australia.—Latrobe Magnesium Ltd. produced magnesium from fly ash in a bulk sample test. Latrobe proposed to build a 5,000-t/yr primary magnesium plant in the Latrobe Valley, Victoria, which would use fly ash with a high magnesium content as the feed material. A feasibility study was expected to be completed by July 2015 with construction beginning by yearend 2016. Future expansion to 40,000 t/yr was being considered (Latrobe Magnesium Ltd., 2014a, b).

Canada.—Three companies proposed projects to produce magnesium in Canada. Alliance Magnesium Inc. was constructing a 200-t/yr pilot plant to test recovery of magnesium from asbestos mine tailings in Asbestos, Quebec. The pilot plant was expected to be completed in 2015 and, if successful, Alliance planned to construct a 50,000-t/yr smelter by 2016 (Cowden, 2014a).

Acana Capital Corp. offered to acquire North American Magnesium Products LLC (Knoxville, TN), which developed a proprietary thermal process to recover magnesium. The company was renamed Mag One Products Inc. when the acquisition was completed in 2015. Mag One planned to build a smelter to produce magnesium from asbestos mine tailings near Danville, Quebec (Janda, 2014; Mag One Products Inc., 2015).

West High Yield Resources Inc. proposed building a smelter to produce magnesium from a serpentine deposit in British Columbia. According to a preliminary economic assessment, measured and indicated resources totaled 10.6 million metric tons of serpentine grading 24.6% magnesium. Construction was pending financing and regulatory approval (West High Yield Resources Inc., 2014).

China.—According to the China Non-Ferrous Metals Industry Association, China produced 874,000 t of magnesium in 2014, an increase of 13% compared with that in 2013. China exported 227,000 t of unwrought magnesium, 7.2% more than in 2013, and 435,000 t of total magnesium products, 5.8% more than in 2013. Consumption of magnesium in China was 401,000 t, 14% more than in 2013. The increase in magnesium consumption was attributed mainly to use in aluminum alloys; primary aluminum production increased by 10% compared with that of 2013. Increased magnesium consumption was also partly attributed to the increased magnesium product exports (China Metal Market—Alumina and Aluminum, 2015a; Leung, 2015b; Shair, 2015; Yee, 2015a, b). Primary magnesium capacity in China at yearend was estimated to be 1.6 Mt/yr (table 7).

Wenxi Baiyu Magnesium Corp. completed its 30,000-t/yr magnesium alloy plant in Wenxi, Shanxi Province, and started production in January (Shair, 2014a). Century Sunshine Group Holdings Ltd. (Hong Kong) expanded the capacity of its smelter in Baishan, Jilin Province, to 25,000 t/yr from 16,000 t/yr. Further expansion to 75,000 t/yr was planned by yearend 2016 (Leung, 2014a). SRM Science and Technology Co. constructed a magnesium alloy plant with a capacity of 30,000 t/yr in Xiangtan, Hunan Province. Rampup of the plant was expected to be completed in 2015 (Leung, 2014c).

Qinghai Salt Lake Magnesium Co. Ltd. continued construction of a 100,000-t/yr smelter to produce magnesium from lake brines in Golmud, Qinghai Province, with trial production expected to begin by 2016. Expansion to 400,000 t/yr was planned, but a construction schedule was not announced (Leung, 2015c).

Magontec Ltd. (Australia) continued construction of a 56,000-t/yr casthouse in Golmud to be supplied with molten magnesium from the adjacent smelter. Installation of casthouse equipment was expected to be completed in 2015 (Magontec Ltd., 2014).

China Magnesium Industry Ltd. was expanding capacity of its smelter to 15,000 t/yr from 3,000 t/yr. The project was expected to be completed by yearend 2015 (Leung, 2014b). Globright Optical Technology Co. was planning to construct a smelter in Hebi, Henan Province, to produce magnesium alloys used in its lighting products. The size of the project and a completion schedule were not disclosed (Shair, 2014b).

Norway.—SilMag (a subsidiary of Serenity Capital Pte. Ltd.) received funding from Innovation Norway's Scheme for Environmental Technologies to develop a secondary magnesium smelter with a capacity of 15,000 t/yr to be completed in 2015. The second phase of the project at the Heroya Industrial Park would include a primary magnesium smelter with a capacity of 50,000 t/yr. The primary smelter would also produce silica. A schedule for completion of the primary magnesium smelter was not available (Himle, 2014).

Outlook

U.S. magnesium consumption is expected to be dependent upon the production of metal alloys containing magnesium, the production of metals that consume magnesium during their production process, and the demand for magnesium die-cast products. A significant portion of U.S. consumption of magnesium will depend on its use in aluminum alloys and domestic primary aluminum production. Use of magnesium in the Kroll process of titanium production is expected to increase as the use of titanium in aerospace applications increases. The development of magnesium alloys that are nonflammable is expected to increase consumption in applications that previously were not suitable for magnesium.

Boeing's backlog of orders for the 787 Dreamliner passenger jet (which contains a significant amount of titanium) suggests that consumption of magnesium for titanium production will increase. Domestic consumption of magnesium for desulfurization of iron and steel is expected to decrease significantly in 2015 because domestic steel production during the first half of the year was 9% less than that in the first half of 2014. Consumption of magnesium by the iron and steel industry in other countries is expected to decrease slightly because steel production was slightly lower in the first half of 2015 than in the same period of 2014 (World Steel Association, 2015).

The trend for increased magnesium use in automotive applications is expected to continue as automobile manufacturers reduce the weight of vehicles by replacing steel and aluminum in cast components with magnesium and as steel sheet is replaced by aluminum alloyed with magnesium. A study commissioned by the Aluminum Association's Aluminum Transportation Group projected that by 2025, 75% of light trucks, 24% of midsize sedans, and 22% of sport utility vehicles sold in North America would use aluminum sheet alloyed with magnesium instead of steel for body panels (Baltic and Tran, 2014). This growth is expected to be compounded by an increase in the amount of vehicles produced. Domestic automobile production through July 2015 increased by 3.6% compared with production in the same period of 2014 (Ward's Automotive Group, 2015). Possible new magnesium producers in Australia, Canada, Norway, and the United States might encourage automotive manufacturers to use magnesium instead of other lightweight alternatives to steel. Historically, because of the limited number of magnesium producers outside of China, domestic automotive manufacturers were somewhat reluctant to choose magnesium over other lightweight materials, such as aluminum alloys or plastic. Because Chinese producers account for 85% of global primary magnesium capacity, and antidumping duties assessed on magnesium imported from China deter imports from China, some automotive manufacturers continue to be cautious about switching to magnesium, thereby limiting the growth of magnesium consumption.

Analysts projected that global primary magnesium consumption would increase by 7.7% per year from 2014 through 2019 and would average 7.8% per year from 2014 through 2024 (McBeth, 2014a). Although some expansion projects are being constructed in China, additional capacity expansions in China are expected to be limited, as production has been only about half of capacity in recent years. However, the Magnesium Industry Association of Shaanxi forecast that production in China would increase by 10% per year to 1.3 Mt/yr by 2020 (Leung, 2015a). Unless new technologies enable a significant decrease in the cost of production, the overcapacity in China is expected to limit the growth of new capacity in other parts of the world.

Exports of magnesium from China are expected to decrease significantly during 2015 compared with exports in 2014, owing to weak demand from overseas markets. Exports of unwrought magnesium through the end of July 2015 decreased by 13% compared with those of the same period in 2014, but exports of magnesium alloys increased slightly during the same period (Yee, 2015c, d). Consumption of magnesium in China was expected to continue to increase as magnesium diecasters expand and aluminum production continues to increase, offsetting the decrease in exports of magnesium. Primary aluminum production in China through June 2015 was 12% more than that of the same period in 2014 (China Metal Market—Alumina and Aluminum, 2015b).

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GENERAL SOURCES OF INFORMATION

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Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.
Magnesian Refractories. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
Magnesium. Mineral Industry Surveys, quarterly.
Magnesium, Its Alloys and Compounds. Open-File Report 01–341, 2001.
Magnesium Metal. Ch. in Mineral Commodity Summaries, annual.

Magnesium (Mg). Ch. in Metal Prices in the United States Through 2010, Scientific Investigations Report 2012–5188, 2013.
Magnesium Recycling in the United States in 1998. Circular 1196–E, 2004.
Magnesium. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.
Magnesium and Magnesite in the CIS in 1996. Roskill Information Services Ltd., 1996.

Other

Economics of Magnesium Metal, The (10th ed.). Roskill Information Services Ltd., 2008.

TABLE 1
SALIENT MAGNESIUM STATISTICS[1]

(Metric tons unless otherwise specified)

		2010	2011	2012	2013	2014
United States:						
Production:						
Primary magnesium		W	W	W	W	W
Secondary magnesium		72,000	67,200	77,100	79,200 r	78,600
Exports		14,800	12,300	18,300	16,100	17,000
Imports for consumption		52,700	48,400	50,800	45,900	52,000
Consumption, primary		56,600	80,600	71,900	68,500	65,700
Yearend stocks, producer		W	W	W	W	W
Yearend price[2]	dollars per pound	2.35–2.50	2.05–2.20	2.15–2.25	2.10–2.15	2.10–2.20
World, primary production[e]		737,000 r	766,000 r	795,000 r	873,000 r	973,000

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company proprietary data.
[1]Data are rounded to no more than three significant digits.
[2]Source: Platts Metals Week.

TABLE 2
MAGNESIUM RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES, BY KIND OF SCRAP AND FORM OF RECOVERY[1]

(Metric tons)

	2013	2014
KIND OF SCRAP		
New scrap:		
Magnesium-base	19,100	17,200
Aluminum-base	35,100 r	36,900
Total	54,200 r	54,100
Old scrap:		
Magnesium-base	606	653
Aluminum-base	24,400 r	23,800
Total	25,000 r	24,500
Grand total	79,200 r	78,600
FORM OF RECOVERY		
Magnesium alloy ingot[2]	W	W
Magnesium alloy castings	11,900	10,500
Aluminum alloys	66,100 r	67,300
Other[3]	1,210 r	721
Total	79,200 r	78,600

[r]Revised. W Withheld to avoid disclosing company proprietary data; included in "Other."

[1]Data are rounded to no more than three significant digits; may not add to total shown.

[2]Includes secondary magnesium content of both secondary and primary alloy ingot.

[3]Includes chemical and other dissipative uses, cathodic protection, and data indicated by symbol W.

TABLE 3
U.S. CONSUMPTION OF PRIMARY MAGNESIUM, BY USE[1]

(Metric tons)

Use	2013	2014
For structural products:		
Castings:		
Die	9,850	8,700
Permanent mold	296	278
Sand	683	660
Wrought products[2]	2,240	2,340
Total	13,100	12,000
For distributive or sacrificial purposes:		
Aluminum alloys	24,400	22,400
Cathodic protection (anodes)	1,090	1,010
Iron and steel desulfurization	8,170	7,800
Nodular iron	626	627
Reducing agent for titanium, zirconium, hafnium, uranium, beryllium	19,300	19,900
Other[3]	1,860	2,070
Total	55,500	53,800
Grand total	68,500	65,700

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes sheet and plate and forgings.

[3]Includes chemicals and scavenger, deoxidizer, and powder.

TABLE 4
YEAREND MAGNESIUM PRICES

		2013	2014
U.S. spot dealer import	dollars per pound	1.90–1.95	1.83–1.89
U.S. spot Western	do.	2.10–2.15	2.10–2.20
China	dollars per metric ton	2,600–2,630	2,300–2,350
European free market	do.	2,700–2,800	2,375–2,475

do. Ditto.

Source: Platts Metals Week.

TABLE 5
U.S. EXPORTS OF MAGNESIUM, BY COUNTRY[1]

	Waste and scrap		Metal		Alloys		Powder, sheets, tubing, ribbons, wire, other forms	
Country	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2013:								
Brazil	--	--	1,480	$5,400	1,010	$7,370	3	$164
Canada	317	$1,010	1,310	4,850	1,540	6,010	122	5,760
Mexico	67	195	26	57	5,290	21,800	156	4,620
Singapore	--	--	2,790	6,910	--	--	9	1,400
United Kingdom	--	--	60	120	91	325	502	15,500
Other	87	218	125	296	317	1,740	805	27,600
Total	471	1,420	5,790	17,600	8,240	37,200	1,600	55,100
2014:								
Brazil	--	--	1,080	3,960	1,460	5,530	3	141
Canada	435	1,340	1,980	6,860	1,060	3,800	105	8,950
Mexico	382	950	59	162	5,710	22,600	185	5,910
Singapore	--	--	2,590	10,300	--	--	22	2,720
United Kingdom	11	11	22	44	39	174	287	11,900
Other	95	155	285	629	635	3,080	553	25,200
Total	923	2,460	6,010	21,900	8,900	35,200	1,160	54,800

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 6

U.S. IMPORTS FOR CONSUMPTION OF MAGNESIUM, BY COUNTRY[1]

Country	Waste and scrap		Metal		Alloys, magnesium content		Powder, sheets, tubing, ribbons, wire, other forms, magnesium content	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
2013:								
Canada	7,030	$16,600	1,360	$1,720	1,140	$4,190	9	$685
China	166	302	2	16	3,360	9,190	227	2,250
Israel	--	--	10,500	45,300	4,350	21,200	--	--
Kazakhstan	--	--	1,080	3,870	--	--	--	--
Mexico	2,880	6,980	--	--	162	505	568	4,170
Russia	--	--	1,200	3,810	234	793	--	--
United Kingdom	1,390	3,720	8	56	893	15,500	14	914
Other	6,040	15,700	994	5,290	2,250	8,900	18	1,180
Total	17,500	43,300	15,200	60,100	12,400	60,200	836	9,200
2014:								
Canada	7,670	18,200	1,200	1,490	1,330	5,480	(2)	45
China	97	238	--	--	5,050	13,000	545	3,680
Israel	--	--	11,700	49,800	3,690	18,800	--	--
Kazakhstan	--	--	156	563	--	--	--	--
Mexico	3,560	6,960	20	50	43	127	594	4,100
Russia	--	--	2,310	7,630	45	258	--	--
United Kingdom	1,350	4,170	(2)	23	1,060	16,700	33	1,920
Other	6,330	14,300	835	4,660	4,390	15,700	28	1,400
Total	19,000	43,800	16,200	64,300	15,600	70,100	1,200	11,100

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 7

WORLD ANNUAL PRIMARY MAGNESIUM PRODUCTION CAPACITY, DECEMBER 31, 2014[1]

(Metric tons)

Country	Capacity
Brazil	22,000
China	1,600,000
India	900
Israel	34,000
Kazakhstan	30,000
Korea, Republic of	10,000
Malaysia	15,000
Russia	80,000
Serbia	6,000
Ukraine	22,000
United States	63,500
Total	1,890,000

[1]Includes capacity at operating plants as well as at plants on standby basis.

TABLE 8
MAGNESIUM: ESTIMATED PRIMARY WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country	2010	2011	2012	2013	2014
Brazil	16,000	16,000	16,000	16,000	16,000
China	654,000	675,000 r	698,000	770,000	874,000
Israel[3]	23,309	26,284	27,292	27,399	26,000
Kazakhstan	15,000 r	21,000	21,000	23,000	20,000
Korea, Republic of	--	--	2,500	7,500	10,000
Malaysia	--	200 [3]	-- r, 3	150 r	--
Russia[4]	20,800 r	17,700 r	18,500 r	18,100 r	17,700
Serbia[4]	1,100 r, 3	1,250 r, 3	1,600 r	1,500 r	1,500
Ukraine	7,000 r	8,300 r	10,500 r	9,500 r	7,300
United States	W	W	W	W	W
Total	737,000 r	766,000 r	795,000 r	873,000 r	973,000

rRevised. W Withheld to avoid disclosing company proprietary data; not included in "Total." -- Zero.
[1]Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes data available through July 21, 2015.
[3]Reported figure.
[4]Includes secondary.